

Lesson 4

How Long Does Trash Last?

Waste Decomposition

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Teaching Strategies

How Long Does Trash Last?

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Teaching Strategies

Group Makeup

Groups should be selected by the lead classroom teacher. The groups should be heterogeneous and learners of all levels should be included.

Group Discovery

The group work is effective for all levels of learners

Chart work

For below level learners and special ed, the teacher may consider having the chart filled out for these students. This would be done after class by the teacher or by having an advanced student help.

Discussion questions

For below level learners and special ed, the teacher may consider grouping the students together. Read the questions aloud and discuss. Help them put their thoughts on paper.

If there are students without home support, you may want to consider letting the students give you the answers orally or help during lunch/recess/before or after school.

Tip: The student worksheet can be made as a transparency for group discussion.

Lesson Time:
60 minutes

Vocabulary

Decompose

Recycle

Reuse

Reduce

Biodegrade

How Long Does Trash Last?

Waste Decomposition



Glass bottles will never decompose.
Glass bottles will never biodegrade.

All decomposition times listed in the exercise below are speculation based on decomposition rates and chemical properties. These times are estimates under “normal conditions.” Refer to William Rathje’s Garbage Project for examples of how long items will last under landfill conditions.

Oh...two facts that *everyone* agrees on...

Glass bottles will never decompose.

Glass bottles will never biodegrade.

Objective

Students will discover how long experts think it takes MSW to break down.
Students will create a chart for MSW decomposition times.
Students will review factors involved in MSW breakdown inside a landfill.

Materials Needed

30	Workbooks (or handouts)
6	Dry erase markers
1	White board

Anticipatory Set

Revisit the concepts from the last two lessons.

Write the lesson objectives on the white board (or show on overhead).
Discuss with the students what the objectives of the lessons are.

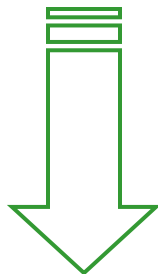
Objective: You will discover how long experts think it takes MSW to break down.

Objective: You will create a chart for MSW decomposition times.

Objective: You will review the factors involved in MSW breakdown inside a landfill.

Introduction:

“So last week we explored the concept of landfills and how they work. I have a list of some things that might end up in the trash. So, unless materials get recycled or reused, they end up in a landfill. Do you ever think about how long the items stay in the landfill before they break down or decompose? We are going to explore how long it will take the items here to decompose or break down.”



Modeling / Guided Practice

1. Have the students take out their workbooks (or handouts).
2. Discuss the key vocabulary words for the lesson. Have the students write the definitions on their worksheets.
3. Divide the students into groups of 5.
4. Draw the students' attention to the list of items on their worksheet.
5. Have the students write which group they belong to in their notebook.
6. As a group, the students should list the amount of time they think the items will take to decompose on the worksheet.
7. When all groups are done, have one rep from each group share their list.
8. Create a table, using the data from all of the groups, on the board. Have the students copy the information into the large table on their worksheets.
9. On the board, write down the degradation times given by scientists.
10. Have the students copy the scientists' list of degradation times onto their worksheet.
11. If there are differences, have discussion as to why.
12. Inform the students that the reason it takes so long for items to decompose in a landfill (see support document)
13. Discuss Rathje's Garbage Project. (see support documents)

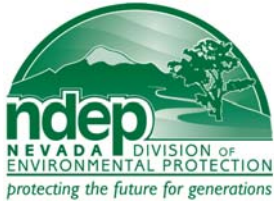
All decomposition times listed in the exercise are speculation based on decomposition rates and chemical properties.
The times are estimates under “normal conditions.”
Refer to William Rathje’s Garbage Project for examples of how long items will last under landfill conditions.

Closure:

1. Close by going over the times it takes for each material to degrade.
2. Emphasize the amount of time recyclables take to degrade.
3. Reinforce the importance of recycling and reusing.

Independent Practice

1. Have the students answer the two questions in their workbook. (This can be done in class if time allows; otherwise, it should be done for homework.)



Support Document

VOCABULARY

How Long Does Trash Last?

Waste Decomposition

Vocabulary

Decompose: To break down into its smallest elements.

Recycle: To break down an item for reuse in producing the same or another kind of item. Example: plastic bottle into a fleece jacket or back into a plastic bottle.

Reuse: Using an item again and again so it will not end up in a landfill. Example: jelly jars used as glasses.

Reduce: To produce less waste by being careful of the way we consume items. The best way to reduce is to buy items with less packaging. Example: purchasing shampoo in bulk or bringing your own container.

Biodegrade: To break down into its smallest elements through the use of micro-organisms.



Support Document

How Long Does Trash Last?

Waste Decomposition

Support Document

Materials

Original List

- Aluminum can
- Banana
- Cigarette butt
- Cotton rag
- Glass bottle
- Leather boot (or shoe)
- Paper bag
- Plastic 6-pack rings
- Plastic jug
- Rubber sole of leather boot (or shoe)
- Styrofoam cup
- Tin can
- Wool sock

Materials and Degradation Time

<u>Scientist List (proper order)</u>	<u>Degradation time</u>
Banana	3-4 weeks
Paper bag	1 month
Cotton rag	5 months
Wool sock	1 year
Cigarette butt	2-5 years
Leather boot (or shoe)	40-50 years
Rubber sole of leather boot (or shoe)	50-80 years
Tin can	80-100 years
Aluminum can	200-500 years
Plastic 6-pack rings	450 years
Plastic jug	1 million years
Styrofoam cup	Unknown? Forever?
Glass bottle	Unknown? Forever?

Support Document

How Long Does Trash Last?

Waste Decomposition

Reasons why items decompose slowly (or not at all!) in a landfill:

Landfills are designed to prevent decomposition. In order for most items to decompose, they need air and water.

Every day 6 inches of soil is placed on the landfill. These layers of trash are then starved of air.

In order to prevent the production and movement of leachate, water is discouraged from entering the landfill.

Because of these conditions (“dry tomb”), items in a landfill decompose at a much slower rate than they would in other conditions.

Support Document

How Long Does Trash Last?

Garbage Project

William Rathje is an archaeologist with the University of Arizona. He began a project in 1972 called The Garbage Project. This project began as a look at the nature of modern human society.

He is the author of RUBBISH!: The Archaeology of Garbage.

The following quotes are listed to provide examples of how long our trash stays in landfills.

(It is important to note that the landfills used in the examples are in the state of Arizona...a climate very similar to Nevada.)

There is no specific date listed for the excavation described.

“Instead of garbage that was at most a few days old, researchers began dealing with garbage that was ten, twenty, thirty years old—sometimes even older.”

Rathje describing the headlines of some of the *newspapers* found from 1971, 1967, and 1952.

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In one landfill, Rathje describes organic material from a landfill layer from the 1950's:

“Almost all the organic material remained readily identifiable: Pages from coloring books that were still clearly that, onion parings were onion parings, carrot tops were carrot tops. Grass clippings that might have been thrown away the day before yesterday spilled from bulky black lawn and leaf bags, still tied with twisted wire...Whole hot dogs have been found in the course of every excavation...”

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Lesson 4**How Long Does Trash Last?**

Date: _____

Objectives: You will discover how long experts think it takes MSW to break down.
 You will create a chart for MSW decomposition times.
 You will review factors involved in MSW breakdown inside a landfill.

Vocabulary:

Decompose:

Reduce:

Reuse:

Recycle:

Biodegrade:

Decomposition List:

Group # _____

List of items	Decomposition time
Aluminum can	
Banana	
Cigarette butt	
Cotton rag	
Glass bottle	
Leather boot	
Paper bag	
Plastic 6-pack rings	
Plastic jug	
Rubber sole of leather boot	
Styrofoam cup	
Tin (steel) can	
Wool sock	

Solid Waste and Recycling Curriculum
Lesson 4

Name: _____

How Long Does Trash Last?

Date: _____

List of items	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Scientist's list
Aluminum can								
Banana								
Cigarette butt								
Cotton rag								
Glass bottle								
Leather boot								
Paper bag								
Plastic 6-pack rings								
Plastic Jug								
Rubber sole of leather boot								
Styrofoam cup								
Tin (steel) can								
Wool sock								

Lesson 4

Name: _____

How Long Does Trash Last?

Date: _____

Why does it take so long for items to decompose in a landfill?

Based on the information above, why does it make sense to reduce, reuse, and recycle?

